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Desalination of granite and sandstones by electrokinetic techniques. Comparison

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Soluble salts are considered as a main reason for damage of porous building materials such as rocks, bricks, granites which are used in the building constructions of the architectural and archaeological heritage. Soluble salts are also responsible for various forms of deterioration such as sand disaggregation and superficial detachments [1-3]. These problems can be solved by conservation technologies which are aimed at decreasing the salt concentration in the rocks (desalination).

The present study aims to investigate the efficiency of electrokinetic techniques for desalination of two different kinds of rocks such as granite and sandstone in which this technique had already been shown to be effective [4, 5]. These rocks were contaminated with NaCl solution and the thickness of the samples used in the tests was 6 cm. This study compares the percentage removal of salts at different depths (efficacy) and the time needed to get this percentage removal (effectiveness) achieved in both stones. From the results obtained, it was possible to find those inherent factors to each stone which could have an influence on the efficacy of the treatment.

As the results, this technique reduced the salt concentration in the granite almost to 100 %, however, in the sandstone samples the decreases were not so high mainly at the intermediate levels (Figure 1) where slight enrichments were observed. The obtained results indicate that although the used technique is efficient for the salt removal regardless of porosimetric distribution of the rock, the better interconnection between the pores (the granite used in this research had a better interconnection) favored that the desalination process in the material happened faster.

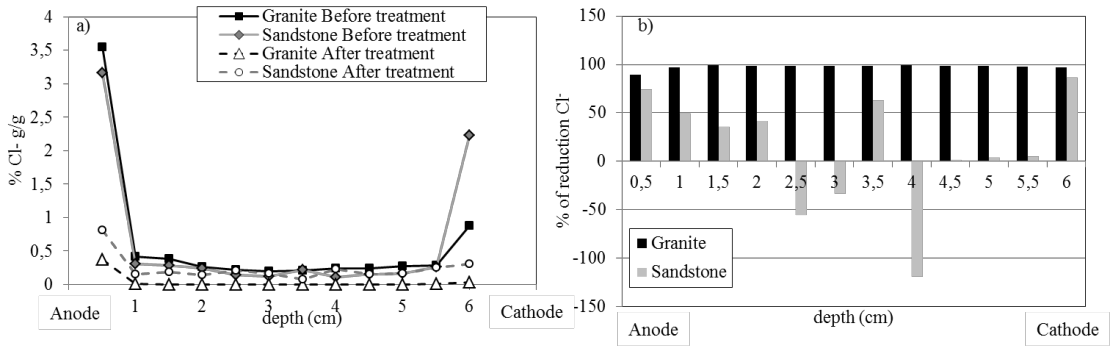

Figure 1.: a) chloride content (%Cl^- g/g referred to the dry weight of the stone) by depth inside the stones (granite; sandstone) before and after desalination test (seven application); b) efficacy (%Cl^-) achieved in each rock

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